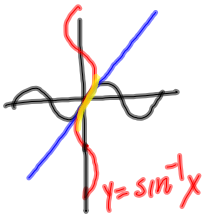
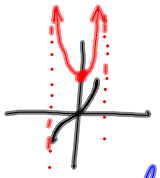
3.9 der of inv trig functions

$y = \sin^{-1} x$ or $y = \arcsin x$

{note: $\sin^{-1} x \neq \frac{1}{\sin x}$}





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If $y = \sin^{-1} x$ $y' = ?$

$y = \sin^{-1} x$

means $\sin y = x$

$a = \sqrt{1-x^2}$ $a^2 + x^2 = 1^2$ $\cos y = \sqrt{1-x^2}$

$y' \cos y = 1$

$y' = \frac{1}{\cos y} = \frac{1}{\sqrt{1-x^2}}$

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$\frac{d}{dx} \sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$ $\frac{d}{dx} \cos^{-1} x = \frac{-1}{\sqrt{1-x^2}}$

$\frac{d}{dx} \tan^{-1} x = \frac{1}{1+x^2}$ $\frac{d}{dx} \cot^{-1} x = \frac{-1}{1+x^2}$

$\frac{d}{dx} \sec^{-1} x = \frac{1}{|x|\sqrt{x^2-1}}$ $\frac{d}{dx} \csc^{-1} x = \frac{-1}{|x|\sqrt{x^2-1}}$

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$\frac{d}{dx} \sin^{-1}(x^2) = 2x \frac{1}{\sqrt{1-(x^2)^2}} = \frac{2x}{\sqrt{1-x^4}}$

$\frac{d}{dx} \sec^{-1}(5x^4) = 20x^3 \cdot \frac{1}{|5x^4|\sqrt{(5x^4)^2-1}}$

$\frac{d}{dx} \tan^{-1}\sqrt{x} = \frac{1}{2}x^{-\frac{1}{2}} \frac{1}{1+(\sqrt{x})^2}$

out $\uparrow$ in $= x^{\frac{1}{2}}$

$= \frac{1}{2\sqrt{x}(1+x)}$

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